Societies and Academies.

LONDON.

Royal Society, June 9.—Prof. C. S. Sherrington, president, in the chair.—Prof. C. S. **Sherrington**: Break-shock reflexes and "supra-maximal" contraction-response of mammalian nerve-muscle to single-shock stimuli. The maximal twitch-contraction of tibialis anticus muscle (cat) evoked by a single break-shock applied to the cut motor nerve exceeds the contraction evoked reflexly (spinal preparation) by a single break-shock applied to an afferent nerve. This is due to the reflex response being tetanic in nature. If the break-shock is strong it excites, even when applied to the motor nerve, a response of tetanic quality. The so-called "over-maximal twitch," now termed "supra-maximal response," is a response of this kind. A reaction of like kind probably obtains in the afferent nerve when the single-shock applied to it is of comparably high value. In this case there is also a tetanic reaction from afferent nerve-fibres themselves. With weaker break-shock stimuli the origin of the tetanic character of the reflex discharge lies in the centre itself. It arises there from a "charge" process which is relatively long-lasting in comparison with the cycle of a nerve-impulse, and increases in intensity and duration with the number of afferent fibres excited.—R. J. **Ludford** and J. B. **Gatenby**: Dictyokinesis in germs-cells, or the distribution of the Golgi apparatus during cell-division. Maturation mitoses in the germ-cells of Cavia, Mus, Helix, Limnæa, and Stenobothrus were examined. In all cases the Golgi apparatus breaks up into its constituent granules, and these are distributed haphazardly to the two daughter-cells at mitosis. In no case examined are they divided between the daughter-cells as equally as are the chromosomes. Hence the Golgi apparatus takes no important part in the transmission of factors from cell to cell.—Dr. F. W. **Edridge-Green**: The effect of red fatigue on the white equation. A white equation is formed by means of a mixture of a red of λ6670–6770 Å., a green of λ5144–5156 Å., and a violet of λ4250–4267 Å., matching a simple white. When the eye is fatigued with light viewed through a red glass, or with pure spectral light in the region of λ6700 Å., and the equation is again made, about half the amount of green is required. The white equation and its match cannot be due to similar physiological processes, or both would change in the same ratio. When the fatiguing light is in the region of λ7800 Å., no difference is seen between the mixed and simple white.—E. **Ponder**: A method for investigating the hæmolytic activity of chemical substances. The relation between the time taken by a given quantity of hæmolytic substance and the temperature at which it acts is expressed by a hyperbola. The relation between the constants of such a hyperbola and the quantity of hæmolytic substance to which it applies are given. Certain general relations hold for all substances examined. Experimental and calculated results are compared.—W. H. **Pearsall**: The development of vegetation in the English lakes, considered in relation to the general evolution of glacial lakes and rock basins. The English lakes are of the same age (glacial), of similar origin, and lie among rocks possessing relatively uniform characters. The differences they show are due to variations in the rates of erosion and sedimentation of the lake basins; therefore it becomes possible to describe the stages in the post-glacial development of a rock basin, and also of its vegetation. The differences observed between primitive and evolved lakes are regarded as being dependent upon their physical condition.

Association of Economic Biologists, June 4.—Sir David Prain, president, in the chair.—F. L. **Engledow**: The problem of increasing the yield of cereal crops by plant breeding. Aspects of experimental investigation, such as breeding for disease resistance, non-lodging, or high intrinsic yield, were considered, and the great difficulty of obtaining any simple criterion for so complex and elusive a total resultant as "yield" was emphasised. Bevan's studies on the migration coefficient as an index of yield were destructively criticised. The relation of yield to the weights of individual grains, to the number of grains per ear, to the number of ears per plant, and to the tillering of the plant was considered. At present comparative estimates are based on "yield per acre," but the author's work suggests that "yield per tiller" may, perhaps, be a better measure, "yield" itself being estimated in terms of starch, carbon, or some other chemical criterion, in place of the commercial standards now accepted.—C. B. **Saunders**: Problems of seed testing. The technique adopted at the official seed-testing station for the testing of purity and germinative capacity was described. Many problems arise in this work of both a mechanical and biological nature. Simple and effective instruments for sampling and non-selective counting are required, as well as selective mechanical devices for the extraction of dodder and other seeds from a mixture. Biological problems largely concern the relation of seed germination to environmental factors, and the apparent inconstancy shown in this relation. Thus seeds of apparently the same kind may under standardised conditions differ considerably not only from year to year and from month to month, but also from sample to sample, and may show periodicities and external factor relationships which give rise to a very great complexity of varying combinations. The whole technique is empirical, and much fundamental research is needed.

CAMBRIDGE.

Philosophical Society, May 16.—Prof. A. C. Seward, president, in the chair.—Dr. E. H. **Hankin**: The soaring flight of dragon-flies. From observation it appears improbable that undiscovered wing-movements or ascending currents of air can be accepted in explanation of soaring flight. Alterations in the amount of sunlight, even when slight, make considerable differences in the flight of dragon-flies. Lowering of the abdomen as a brake on speed in catching prey, etc., is a common phenomenon. Dragon-flies, flying-fishes, and birds all exhibit soaring flight, and in each class evidence is accumulating that low-speed flight depends on the presence of sunshine and high-speed flight on the presence of wind. If not identical, the speeds attained in the three classes are comparable.—C. G. **Lamb**: Note on secondary sexual characters in the Diptera, with a description of a novel type. The author discussed some points in the structure of the hypopygium in flies, and gave a description of some secondary characters in a new genus of Dolichopodidæ which were situated centrally instead of peripherally.—L. A. **Borradaile**: A note on the mouth-parts of certain Decapod crustaceans. Some Decapods, as Hapalocarcinus and Porcellana, seize food-particles directly; others, as Pinnotheres and the Pontoniinæ, take it from sessile organisms. The mouth-parts of the former are modified for their mode of feeding. Similar modifications are not found in the latter, possibly because their food reaches them entangled in strings of mucus. Porcellana has no such jaw-reduction as is found in Hapalocarcinus, and this is as yet unexplained.—J. **Gray**: Hermaphrodite sea-urchins.—A. B. **Appleton**: (1) Preliminary note on the development of muscle, bone, and body-weight in sheep. A summary was given of some results obtained in conjunction with Mr. J. Hammond over a number of years. The data brought forward referred to parts much utilised in the judging of sheep, viz. "hind-limb," "loin," "behind the shoulder," and "over the shoulder." In normal rams the muscles increase in weight after birth faster than the associated bones, while the ratio found in adults is nearly attained at the age of three months. From birth onwards the carcass forms an increasing proportion of the live-weight of the animal. The development of the hind-limb proceeds as a wave of growth passing upwards from below. Histological examination of the muscles in the prize animals shows that a very large amount of fat is present between the muscle-fibres in addition to that between muscle-bundles. Fat in the popliteal space and around the pelvis was notably increased. The characteristic "feel" and appearance of prize animals appear to be due to bone reduction as well as to fat and muscle increase. (2) The alleged inheritance of an acquired character in man. Photographs were shown of ankle-joints of new-born English children. Features are present which, from their presence in the newly born natives of India, have been claimed as the inheritance of a character acquired by their parents through adoption of the squatting posture. This cannot be the case in the English child. The features found in the new-born child are held to be the anatomical outcome of the normal attitude of the fœtus. (3) The so-called gluteus maximus of Tarsius. This is stated to be a compound muscle, since it includes the femoro-coccygeal and caudofemoral muscles. This is the interpretation given of the position of the great sciatic nerve, which passes through the gluteus maximus. In lemurs and in the primitive insectivore Tupaia a similar condition was found.—H. P. **Waran**: The effect of a magnetic field on the intensity of spectrum lines, ii. The earlier work of Kent and Frye on the subject is discussed and the invalidity of conclusions obtained under adverse experimental conditions proved by proper control experiments. Further study of the phenomenon conducted in a quartz tube are described. The enhancing effect of the magnetic field on the negative glow bands of nitrogen and the Balmer series of hydrogen are described, and the Balmer series is suggested to be mainly the radiations of the atom while the gas is at a high pressure. Experiments with a condensed discharge have proved the difference between its effect and that introduced by the magnetic field.—C. G. F. **James**: The theoretical value of Sutherland's constant in the kinetic theory of gases.—T. S. **Yang**: Orthogonal systems and the moving trihedral.

DUBLIN.

Royal Irish Academy, May 23.—Prof. Sydney Young, president, in the chair.—G. A. J. **Cole**: The problem of the Bray series. The stratigraphical position of the series of quartzites and slates that form Bray Head and Howth in the Dublin district has always seemed obscure. While the few organic remains indicate a Cambrian age, these rocks appear in places to overlie Ordovician strata, and they have suffered no invasion or metamorphism by the closely adjacent Leinster granite. Examination of the successive MS. notes in records of the Geological Survey of Ireland shows how the problem was under discussion between 1855 and 1865. In the present paper it is suggested that the Bray series has been brought into position along a thrust-plane from the south-east during the later phases of the Caledonian folding, and that the outlying mass of Carrickgallogan is a "klip" resting, as Du Noyer believed, on Ordovician slates.

PARIS.

Academy of Sciences, May 23.—M. Georges Lemoine in the chair.—C. **Moureu**, M. **Murat**, and L. **Tampier**: Acrylic acid and acrylic esters. Halogen propionic acids and esters. Starting with pure acrolein, now readily obtainable in quantity, a method of preparing acrylic acid is described based on the intermediate production of β-chloropropionic acid. The acrylic acid was purified by repeated fractional crystallisation, and its physical constants were determined. The pure acid combines quantitatively at the ordinary temperature with the halogen acids.—A. **Blondel**: The topographical representation of the couples of alternating-current motors.—**Prince of Monaco**: Official visit to the United States.—C. **Guichard**: The 31 systems all the right lines of which belong to a linear complex.—M. Jean Massart was elected a correspondant for the section of botany in succession to the late M. Pfeffer.—G. **Julia**: The discontinuities of the solutions of certain Fredholm's equations.—P. **Humbert**: Hypergeometrical polynomials.—P. **Lévy**: Some questions of the functional calculus.—E. **Esclangon**: The aurora borealis of May 14–15, 1921, observed at Strasbourg.—M. **Luce**: Chemical reactions and radius of curvature. A continuation of work previously published on the same subject. It is shown that the influence of the curvature of a solid is the same in liquids as in gases, and that the data in both cases can be expressed by a similar formula.—M. **Bridel**: The application of the law of mass action to the results obtained in the reaction of β-galactosidase on galactose in solution in propyl alcohol. The application of the law of mass action to this reaction shows that in many cases equilibrium had not been reached when the experiments were stopped. For the stronger alcohols it would be necessary to prolong the experiments for months, or even years, to attain equilibrium.—A. **Tian**: A cause of dispersion of the colloid in an important class of hydrosols.—A. **Boutaric** and M. **Vuillaume**: The flocculation of colloidal arsenic sulphide. Principle of a method of study. The opacity of the solutions was measured in a Féry spectrophotometer; absorption curves are given showing the influence of time, of excess of hydrogen sulphide, and of excess of arsenious oxide. To have strictly comparable flocculation the colloidal solution must contain neither free sulphuretted hydrogen nor arsenious oxide.—E. **André**: Contribution to the study of the oil from grape pips. The chemical and physical constants of eleven samples of oil from different sources are given; the figures show great divergences, and it is evident that the composition of this oil varies considerably with the kind of grape.—P. **Gaubert**: The artificial coloration of crystals obtained by the solidification of a fused substance and on crystalline diffusion.—F. **Ehrmann** and J. **Savornin**: The stratigraphical scale of the Kabylie des Babors.—R. **Dongier**: The simultaneous oscillations of the pressure and wind at the top of the Eiffel Tower, and their relation with the squall surface (J. Bjerkness) of a depression. A reproduction of the curves of the recording instruments, showing the atmospheric pressure, wind velocities at the summit and base of the tower, and temperatures on September 15, 1906. The conclusions resulting from a detailed examination of these diagrams are in agreement with the theory of J. Bjerkness.—Ad. **Davy de Virville** and R. **Douin**: The modifications of form and structure of liverworts submerged in water. Seven species have been studied, and were found to adapt themselves to the new medium, undergoing remarkable changes in development, size, and structure.

If these forms had been met with in Nature, without knowing their history, they would have been described as varieties, and even as new species.—P. **Choux**: A new leafless Asclepias from the north-west of Madagascar.—S. **Jonesco**: Contribution to the study of the physiological *rôle* of the anthocyanins.—A. **Lumière** and H. **Couturier**: Anaphylaxy in plants. Experiments are described and illustrated by reproductions of photographs proving definitely that an anaphylactic state can be established in plants.—R. **Courrier**: The interstitial gland of the testicle and secondary sexual characters in fishes.—Mlle. **Larbaud**: New technique for the inclusions and microscopical preparations of vegetable and animal tissues. The use of butyl alcohol instead of ethyl alcohol is proposed for dehydrating the tissues. It has the advantage of dissolving paraffin wax, thus rendering unnecessary the use of xylene or toluene, and the number of treatments can be reduced from six to two.—G. **Truffaut** and N. **Bezssonoff**: Increase in the number of *Clostridium pastorianum* in soils partially sterilised by calcium sulphide.—R. **Poisson**: Researches on the determinism of the loss of the faculty of flight in the aquatic Hemiptera.

ROME.

Reale Accademia nazionale dei Lincei, April 3.—V. Volterra, vice-president, in the chair.—Papers by fellows:—G. **Castelnuovo**: Abelian functions, iii.: Jacobi's varieties.—C. **Segre**: The principal lines of a surface of S_5 and a characteristic property of Veronese's surfaces, i.—F. **Severi**: Theory of simple integrals of first species belonging to an algebraic surface, ii.—Communicated through fellows:—G. **Rovereto**: Erosive development considered as starting from a fundamental surface.—C. **Jucci**: Metabolism of true royal forms in the society of the Termites, ii.—Prof. Corbino read an account of the life and work of the late Prof. Augusto Righi, who died on June 8, 1920, and a similar notice relating to the late Prof. Michele Rajna, who died on September 29, 1920, was contributed by Dr. Legge. Among additions to the Academy library were mentioned treatises on dynamics of systems by Prof. Maggi and on statics of dams for lakes and science of construction by Prof. Guidi, presented through Prof. Levi Civita, in addition to several mathematical works.

Books Received.

Solvency or Downfall? Squandermania and its Story. By Viscount Rothermere. Pp. xi+160. (London: Longmans, Green and Co.) 2*s*.

Dairy Bacteriology. By Prof. Orla-Jensen. Translated from the second Danish edition by P. S. Arup. Pp. xii+180. (London: J. and A. Churchill.) 18*s*. net.

Tables, Factors, and Formulas for Computing Respiratory Exchange and Biological Transformations of Energy. Prepared by Thorne M. Carpenter. (Publication No. 303.) Pp. 123. (Washington: Carnegie Institution.) 2 dollars.

Index to United States Documents relating to Foreign Affairs, 1828–61. By Adelaide R. Hasse. (In three parts.) Part iii.: R to Z. (Publication No. 185, part iii.) Pp. 1331–1980. (Washington: Carnegie Institution.) 7 dollars.

Principes de Biologie Végétale. By Prof. Noël Bernard. (Nouvelle Collection scientifique.) Pp. xii+212. (Paris: F. Alcan.) 8 francs net.

Microbiology: A Text-Book of Microörganisms General and Applied. Edited by Prof. Charles E. Marshall. Third edition, revised and enlarged. Pp. xxviii+1043+1 plate. (London: J. and A. Churchill.) 21*s*. net.

From a Modern University: Some Aims and Aspirations of Science. By Prof. Arthur Smithells. Pp. 124. (London: Oxford University Press.) 12*s*. 6*d*. net.

The Commercial Apple Industry of North America. By J. C. Folger and S. M. Thomson. (Rural Science Series.) Pp. xxii+466+xxiv plates. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd.) 18*s*. net.

L'Astronomie et les Astronomes. By Auguste Collard. Pp. viii+119. (Bruxelles: G. Van Oest et Cie.)

Pneumatic Conveying: A Concise Treatment of the Principles, Methods, and Applications of Pneumatic Conveyance of Materials. By E. G. Phillips. (Pitman's Technical Primers.) Pp. xii+108. (London: Sir I. Pitman and Sons, Ltd.) 2*s*. 6*d*. net.

Tanning Materials. With Notes on Tanning Extract Manufacture. By Arthur Harvey. Pp. vii+182. (London: Crosby Lockwood and Son.) 15*s*. net.

Perfumes, Essential Oils, and Fruit Essences Used for Soap and other Toilet Articles. By Dr. Geoffrey Martin. (Manuals of Chemical Technology, X.) Pp. vii+138. (London: Crosby Lockwood and Son.) 12*s*. 6*d*. net.

Elements of Practical Geometry. A Two Years' Course for Day and Evening Technical Students. By P. W. Scott. Pp. v+185. (London: Sir I. Pitman and Sons, Ltd.) 5*s*. net.

A Geological Excursion Handbook for the Bristol District. By Prof. S. H. Reynolds. Second edition. Pp. 224. (Bristol: J. W. Arrowsmith, Ltd.; London: Simpkin, Marshall and Co., Ltd.) 5*s*. net.

Exponentials Made Easy; or, The Story of "Epsilon." By M. E. J. Gheury de Bray. Pp. x+253. (London: Macmillan and Co., Ltd.) 4*s*. 6*d*. net.

A Text-Book of Inorganic Chemistry. Edited by Dr. J. Newton Friend. Vol. ix., part ii.: Iron and its Compounds. By Dr. J. Newton Friend. (Griffin's Scientific Text-books.) Pp. xxv+265. (London: C. Griffin and Co., Ltd.) 18*s*.

Tuberculosis: Its Prevention and Home Treatment. By Dr. H. Hyslop Thomson. (Oxford Medical Publications.) Second edition. Pp. ix+99. (London: H. Frowde and Hodder and Stoughton.) 4*s*. net.

Year-Book of the Royal Society of London, 1921. (No. 25). Pp. iv+201. (London: Harrison and Sons, Ltd.) 7*s*. 6*d*.

Library of Congress. A List of Geographical Atlases in the Library of Congress, with Bibliographical Notes. Compiled under the direction of Philip L. Phillips. Vol. iv. Pp. clxiii+639. (Washington: Government Printing Office.) 1.25 dollars.

Biochemistry: A Study of the Origin, Reactions, and Equilibria of Living Matter. By Prof. Benjamin Moore. Pp. vii+340. (London: E. Arnold.) 21*s*. net.

Fabre, Poet of Science. By Dr. G. V. Legros. Translated by Bernard Miall. Second impression. Pp. 352. (London: T. Fisher Unwin, Ltd.) 8*s*. 6*d*. net.

Oxford University Junior Scientific Club. Electrons and Ether Waves. Being the Twenty-third Robert Boyle Lecture, on May 11, 1921. By Sir William Bragg. Pp. 14. (London: Oxford University Press.) 1*s*. net.

Oxford and the Rural Problem. Being the First Sidney Ball Memorial Lecture, December, 1920. By the Right Hon. Sir Horace Plunkett. (Barnett House Papers, No. 6.) Pp. 18. (London: Oxford University Press.) 1*s*.